

BUS & COACH

APPLICATION PRODUCT GUIDE



ERMEC,SL BARCELONA
Avda.Arraona,85, Nave 4
08210 Barberà del Vallès
España
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID
c/Puerto Rico, 4
28222 Majadahonda
España
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51

www.ermec.com

CROSS-INDUSTRY BUS & COACH EXPERTISE



Since 1947, Ermec (Omega Group) has been synonymous of professional reliability, and engineering excellence. Today, we are a **trusted partner in the bus and coach industry**, grants advanced solutions for bus and coach applications involved in dashboard and cabin controls, passenger information systems, lighting, and body electronics.

We offer a comprehensive portfolio built around leading brands in switching and control components, high-performance connectivity, sensors, and circuit protection technologies. Our solutions are designed to meet the demanding requirements of modern vehicle environments, where performance, safety, and durability are critical.

Ermec (Omega Group) provides advanced components compliant with international automotive and rail-vehicle standards, featuring high vibration resistance, wide temperature range, and reliable performance in demanding transport applications.

High-reliability switches and connectors capable of hundreds of thousands of operating cycles, to customized cable assemblies and connectivity solutions, using technologies ensuring durability, precision, and efficiency in the harsh vehicle environment.

Our offering also includes ergonomic and highly reliable human-machine interface (HMI) solutions—such as dashboard switches, joysticks, and driver control systems—engineered for intensive use aboard buses and coaches. In addition, our thermal protection and circuit protection components help prevent electrical faults, ensuring passenger and driver safety.

With deep expertise in standards such as ECE R118 and IP/IK ingress and impact protection requirements, we ensure maximum reliability for both drivers and passengers in demanding vehicle environments.

At Ermec (Omega Group), we go beyond distribution. We deliver tailored, value-added solutions that integrate seamlessly into bus and coach electrical systems—helping manufacturers and fleet operators enhance safety, reliability, and performance.



Over 32,000
references in stock



National deliveries
in 48 hours



International
deliveries

BUS & COACH

Ertec (Omega Group) delivers reliable solutions for Dashboard & Cabin Controls, Passenger Information Systems, Lighting & Signaling and Body Electronics, based on leading technologies in Control, Connectivity and Protection.



Dashboard & Cabin Controls



Passenger Information Systems



Lighting & Signaling



Door & Access Control

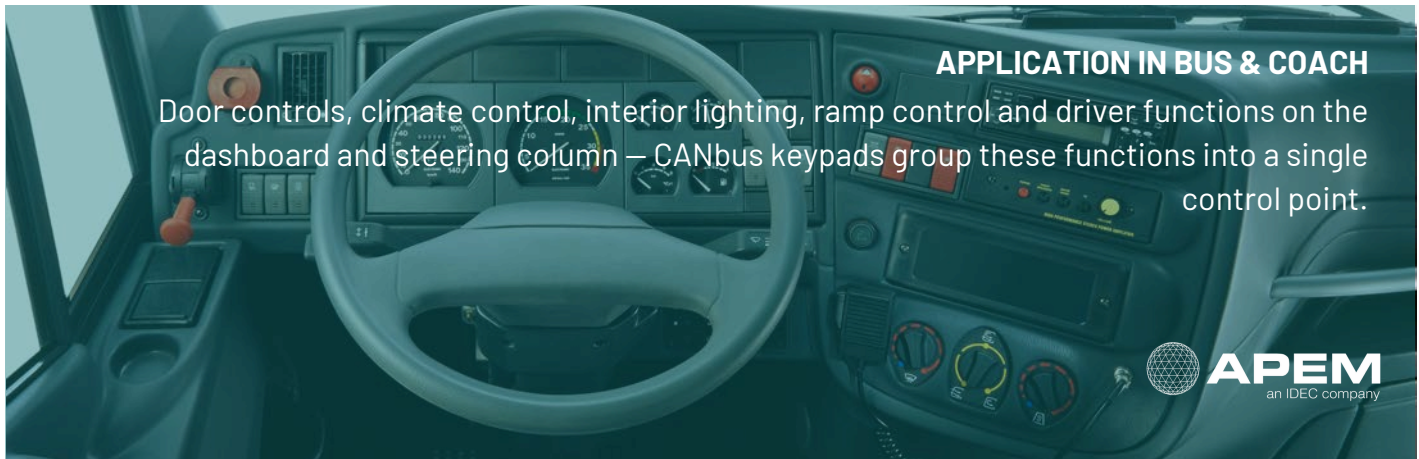


HVAC & Climate Control



Body Electronics & Protection





APPLICATION IN BUS & COACH

Door controls, climate control, interior lighting, ramp control and driver functions on the dashboard and steering column — CANbus keypads group these functions into a single control point.

APEM is a French manufacturer with over 30 years as a control systems supplier in Europe, offering the widest range of customization — body, iconography, backlighting and IP rating — to match each vehicle's dashboard. The range spans rocker, key, lever, capped and safety-guarded switches in a single family, plus CANbus keypads for grouped driver functions.

The key feature of **APEM's** switches and controls is that they cover the full dashboard and driver console — from individual switches to CANbus keypads — with vandal-resistant options for passenger access areas.



SERIE FNR

Forward/reverse rocker switch

- 1, 2, or 3 axis analog output
- PWM, CAN J1939, CANopen
- IP66, 10 million mechanical cycles
- Used for ramp, lift and mirror controls



SERIE WP

Large-surface sealed pushbutton

- Illuminated rocker switch for forward/reverse control
- Highly customizable body, icons and backlighting
- Multiple IP sealing levels available
- Widely used for ramps, doors and drive functions



SERIE AV / Q22

Stainless steel vandal-resistant pushbuttons

- Extreme sealing for exterior and heavy-duty use
 - Large actuation surface for easy operation
 - Designed for demanding outdoor environments
- Custom legends and symbols available



3000 SERIES

1, 2, or 3-axis joystick

- Momentary or latching operation
- 12 to 16 mm bezel sizes available
- Sealed to IP67 for washdown and outdoor use
- Widely used for passenger stop-request systems



SERIE PKD (KEYPAD)

- CANbus keypad with integrated rotary knob
- Typical use for climate control panels
- LED backlighting per key, sealed against dust and moisture
- Direct CAN bus communication with vehicle electronics
- Groups driver functions in a single control point



SERIE KS (KEYPAD)

- Key-switch keypad panel for ignition and restricted functions
- Part of APEM's CANbus keypad range
- Sealed construction for cabin environments
- Custom key patterns and access levels available

APEM SWITCHES & CONTROLS



Beyond its dashboard switch range, **APEM** covers emergency stop, indicator and pushbutton functions with the same 30+ years of European control-systems expertise — E-STOP switches, toggle switches, the wider AV series family and customizable IP series pushbuttons.

The key feature of APEM's indicators and auxiliary switches is that they extend the same vandal-resistant, sealed design philosophy to signaling and emergency functions throughout the vehicle.



E-STOP SWITCHES

Ø16/22mm, IP65 sealing

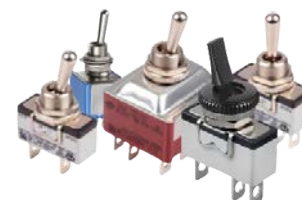
- Approved EN 60947-5-1, EN 60947-5-5
- Illuminated or non-illuminated
- Front sealing IP65
- Used for driver emergency stop



AV SERIES (GENERAL)

Multiple actuator & finish options

- Ø16, 19, 22 or 30mm
- Nickel, chrome, varnished or stainless steel
- Flat or curved actuator, custom marking
- Front panel sealing IP65



TOGGLE SWITCHES

Up to 3 positions

- Momentary or alternate functions
- PCB solder lugs, quick-connect or wire wrap
- Numerous ratings and sealing options
- Used for auxiliary control functions



I SERIES SWITCHES

Customizable momentary pushbuttons

- Illuminated or non-illuminated
- Sealed to IP67
- Round or square actuator
- Gold-plated silver contacts, custom terminals



Q SERIES LED INDICATOR

- 5mm flush diffused LED, RGB available
- IP67 sealing option (EN60529)
- -40°C to +85°C, 100,000h life expectancy
- Stainless steel 316L construction



INDUSTRIAL INDICATORS (LB/LBW)

- IP65 LED sealing
- Ø16, 18 or 22mm
- Up to 3 contacts, up to 5A
- UL, CE, TUV, CCC, CSA qualified

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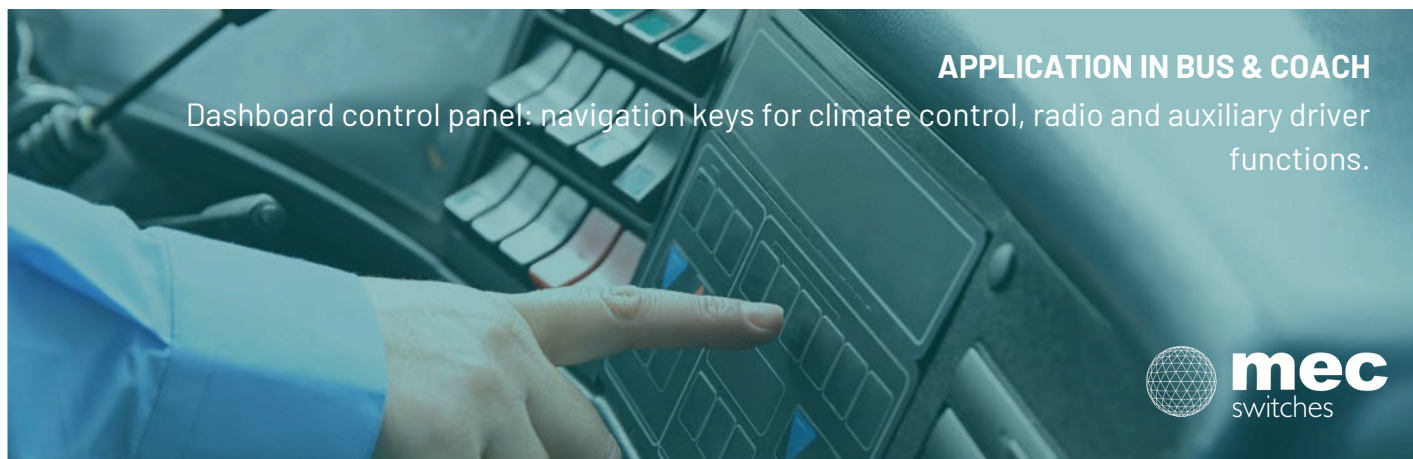
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APPLICATION IN BUS & COACH

Dashboard control panel: navigation keys for climate control, radio and auxiliary driver functions.



MEC is a French manufacturer, part of the **APEM** group since 1998, recognized as one of Europe's leading manufacturers of tactile pushbuttons for PCB, with customized solutions for instrument control panels.

MEC's key strength is combining a modular switch portfolio — from ultra-compact PCB pushbuttons to fully custom navigators — with extensive personalization: photo-realistic printing, custom actuation force and scratch-resistant finishes.



MULTIMEC

PCB tactile pushbutton

- IP67 sealed
- Through-hole or SMD mounting
- 10,000,000 cycle life
- Compact, modular design



ULTRAMEC

Low-profile PCB pushbutton

- 8x8mm low-profile footprint
- IP66 sealed
- 3,000,000 cycle life
- Ideal for space-constrained panels



UNIMEC

Dual-pole safety switch

- IP54 sealed
- Double pole NO+NC contacts
- Momentary or latching action
- Suited for safety interlock logic



NAVIGATORS (NAVIMEC / CONTROLMEC)

Rocker & navigator switches

- Single, navigator or rocker switch formats
- Highly customizable body and actuator
- Used for dashboard navigation controls
- Multiple termination options

ROUND & SQUARE BUTTONS

- Panel pushbuttons
- Diameters from 6.5 to 30 mm
- Sealing and illumination options
- Wide range of colors
- Custom legends available



ROCKERMEC /ULTRANAVIMEC

- Modular rocker (10.6x28mm) and 5-position navigator (Ø22.14mm) modules
- Both IP67 sealed, LED illumination
- Rockermec: 500,000 cycles / Ultravimec: 500,000 activations
- Custom cap colors, legends and configurations

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APPLICATION IN BUS & COACH

Thermal protection of auxiliary motors and fans, pressure/temperature monitoring in braking and climate systems, and liquid level detection for coolant, AdBlue and washer fluid reservoirs.

Sensata
Technologies

Sensata Technologies is an American manufacturer of sensors and electrical protection components, serving the automotive, heavy vehicle and bus/truck/trailer markets worldwide — including through its established brands Klixon, Airpax and Gigavac. The range spans pressure and temperature sensors, high-voltage contactors, hydraulic-magnetic circuit breakers, bimetallic thermal protectors and liquid level/flow sensors.

The key feature of Sensata's sensors and protection devices is that they combine automotive-grade precision with more than 90 years of thermal-protection expertise — critical wherever a failure is not an option.



PRESSURE & TEMPERATURE SENSORS

Critical vehicle circuit sensors

- Wide operating temperature range
- High precision, automotive-grade
- Used in braking, cooling and HVAC circuits
- Robust against vibration



GIGAVAC CONTACTORS

High-voltage switching

- For electrified and hybrid vehicle systems
- High current switching capability
- Compact, sealed construction
- Long electrical and mechanical life



AIRPAX HYDRAULIC-MAGNETIC SWITCHES

Resettable circuit protection

- Rearmable circuit breaker technology
- Used across telecom, industrial and transport
- Available in modular distribution panels
- Resistant to vibration and shock



KLIXON THERMAL PROTECTION

Thermostats & bimetallic protectors

- Bimetallic protectors and solid-state relays
- -40°C to +105°C range
- Over 15-year service life
- UL 60335-2-40/-2-89 approved



GAS DETECTORS

- High precision, long service life
- Suited for critical safety monitoring
- Robust for demanding environments
- Approved to relevant safety standards



LEVEL & FLOW SENSORS

Cynergy3 series

- Liquid level and flow detection
- Prevents overfill in fluid reservoirs
- Used for coolant, AdBlue and washer fluid
- Accurate and reliable performance

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APPLICATION IN BUS & COACH

Dashboard actuators, driver emergency stop, door safety interlocks, control relays and interior lighting — covering the electrical control needs of the vehicle.

IDEC Corporation is a Japanese manufacturer founded in 1945, with over 70 years of experience in automation and control devices — and the parent company of APEM since 2017. The range spans pushbuttons, selectors, pilot lights, emergency stop switches, interlock safety switches, relays and LED lighting, serving industries worldwide including public transportation.

The key feature of IDEC's switches and controls is that they combine industrial-grade durability with dashboard and safety-critical applications — from illuminated actuators to "Safe Break Action" emergency stops.



ACTUATORS Ø22mm Pushbuttons, selectors, pilot lights

- Up to 6 poles
- Illuminated option available
- UL/CE approved
- Widely used for dashboard and door controls



ACTUATORS Ø16mm Compact pushbuttons, selectors, pilots

- Up to 2-3 poles
- Illuminated option available
- Approved
- Ideal for space-constrained panels



EMERGENCY STOP Ø22/Ø30mm "Safe Break Action" technology

- Up to 4 contacts
- With or without illumination
- Positive-opening NC contacts
- Used for driver emergency stop



INTERLOCK SWITCHES Door safety switches

- Mechanical, solenoid, RFID or magnetic
- IP65/IP67 sealed
- Compact sizes available
- Used for door safety interlocks



RELAYS Control relays

- 1 to 6 poles
- DIN rail, panel or PCB mounting
- Screw, plug-in or PCB contacts
- Used for vehicle electrical control



LED LIGHTING Interior & signal lighting

- Slim, compact or rugged types
- High brightness option
- Different sizes available
- Used for cabin and signal lighting

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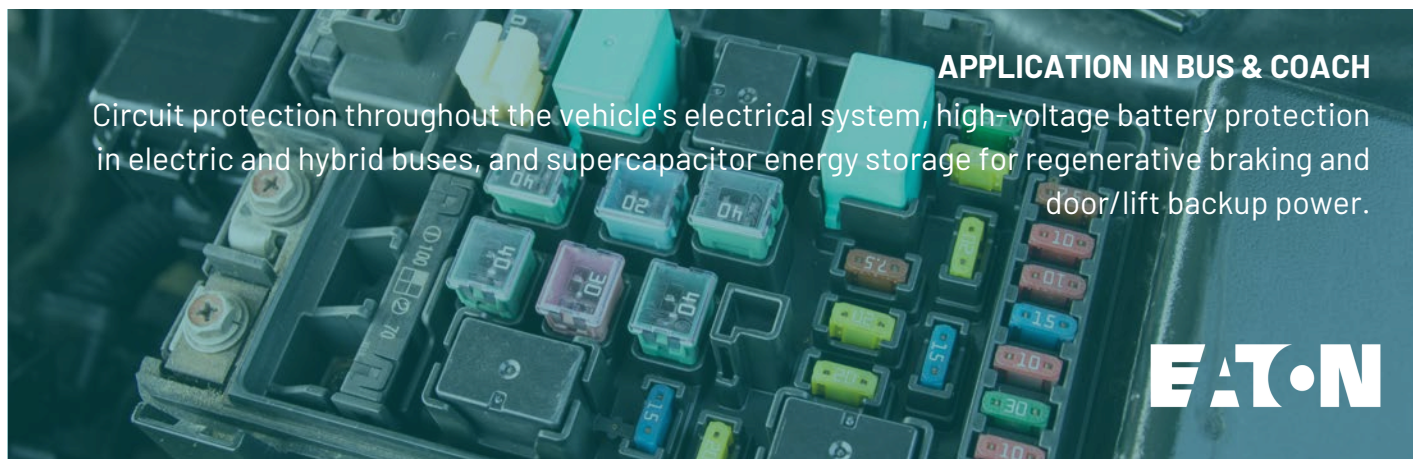
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APPLICATION IN BUS & COACH

Circuit protection throughout the vehicle's electrical system, high-voltage battery protection in electric and hybrid buses, and supercapacitor energy storage for regenerative braking and door/lift backup power.

EATON

Eaton is an American-Irish multinational founded in 1911, a global leader in power management and electrical protection — with its Bussmann series recognized worldwide as the industry standard for circuit protection, serving the automotive, heavy vehicle and electric-vehicle markets.

The key feature of Eaton's range is that it scales from small cylindrical and SMD fuses for control circuits up to high-voltage Bussmann EV fuses and supercapacitors for energy storage — protecting and powering everything from low-current electronics to regenerative braking systems.



CYLINDRICAL FUSES 5x20mm

Glass or ceramic, fast/time-delay

- 32mA to 25A
- Glass or ceramic body
- Fast or time-delay
- General-purpose circuit protection



CYLINDRICAL FUSES 6.3x32mm

Ceramic, fast-acting

- 1A to 13A
- Ceramic body
- Fast-acting
- Compact cylindrical format



SMD FUSES

Fast or time-delay

- 250mA to 30A
- Sizes 1025, 6125, 3216
- 32V to 250V
- Surface-mount protection



MICRO-FUSES

Fast or time-delay

- 50mA to 6.3A
- 250V rating
- Fast or time-delay
- Used in low-current control circuits



SUPERCAPACITORS

Energy storage & buffering

- Coin cell, cylindrical and modular formats
- Used in regenerative braking systems
- Backup power for doors and lifts
- Long cycle life, rapid charge/discharge



EV FUSES (BUSSMANN SERIES)

High-voltage battery protection

- Protects EV/hybrid batteries and contactors
- Up to 500 Vdc, 50-400A
- Compact bolt-on and 10x38mm formats
- 20 kA interrupting rating

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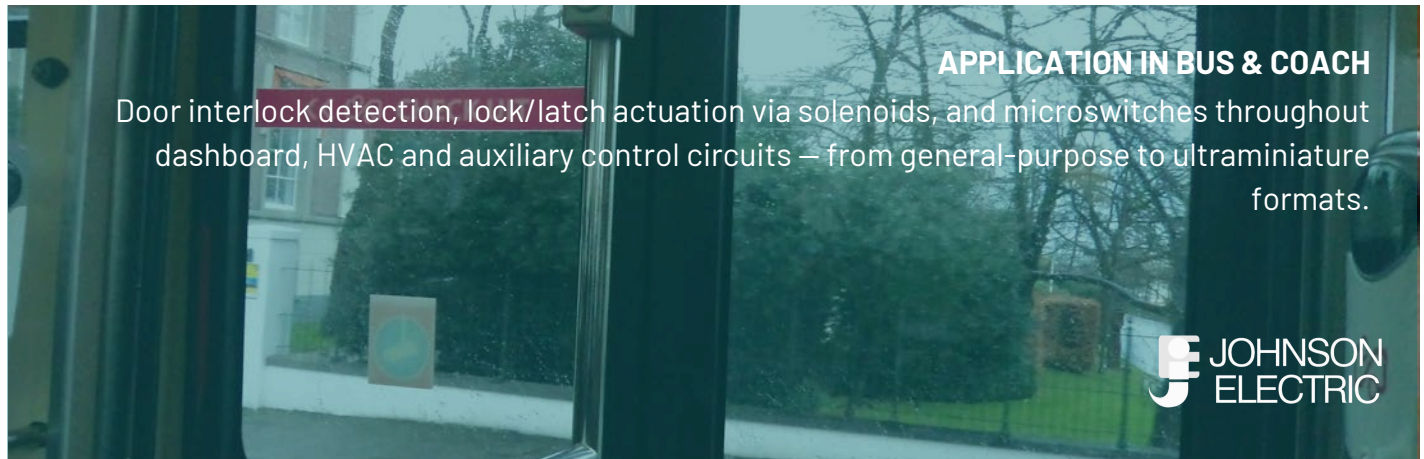
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Johnson Electric, founded in 1959, is a world leader in motors, control systems and flexible interconnections, serving automation, industrial equipment and medical devices among other markets. The range spans standard to ultraminiature microswitches, plus linear and rotary solenoids for door lock and latch actuation. The key feature of Johnson Electric's switches and solenoids is that they scale precisely to the application — from general-purpose door interlock detection to ultraminiature switches for space-constrained control assemblies.



STANDARD MICROSWITCHES

10A to 25A, IP67 available

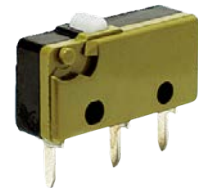
- 10A to 25A rating
- 125V/250V
- IP67 sealed option
- Used for general control circuits



MINIATURE MICROSWITCHES

5A to 12A, IP67 available

- 5A to 12A rating
- 250V
- IP67 sealed option
- Compact panel-mount format



SUBMINIATURE MICROSWITCHES

IP40/IP67 available

- 5A to 12A rating
- 250V
- IP40 or IP67 sealing
- Used in space-constrained assemblies



ULTRAMINIATURE MICROSWITCHES

IP54/IP67 available

- 0.3A to 5A rating
- 250V
- IP54 or IP67 sealing
- Used for door and interlock detection



SOLENOIDS

Linear & rotary actuation

- Push-pull linear or rotary types
- Used for door lock and latch actuation
- Custom stroke and force options
- Compact, robust construction



DOOR INTERLOCK SWITCHES

Safety detection for doors

- DPST-N0 configuration
- Detects door open/closed state
- Rugged for repeated cycling
- Used for passenger door safety interlocks

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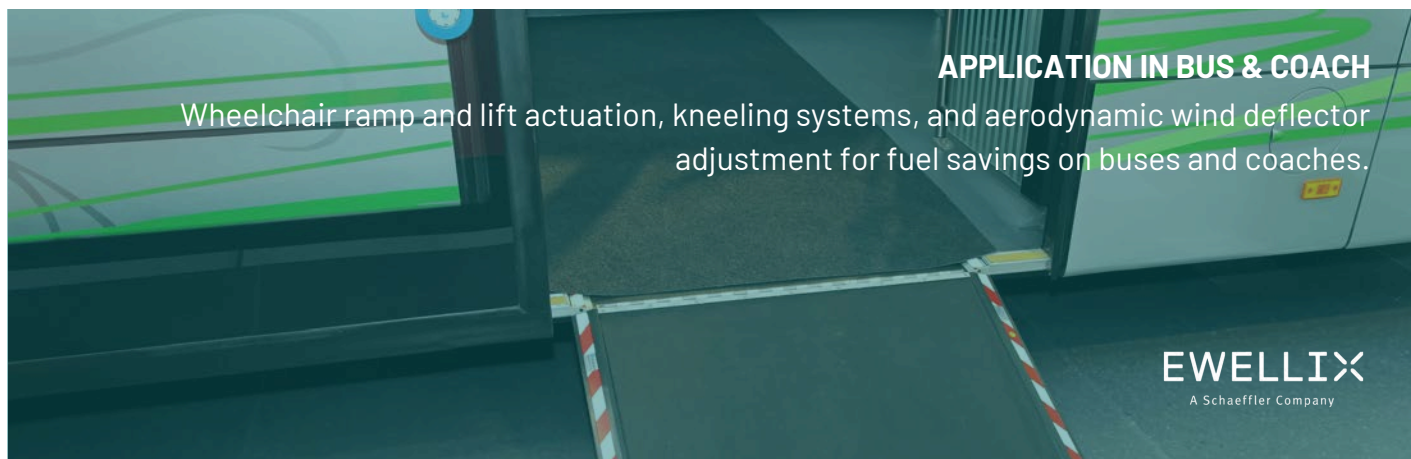
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APPLICATION IN BUS & COACH

Wheelchair ramp and lift actuation, kneeling systems, and aerodynamic wind deflector adjustment for fuel savings on buses and coaches.

EWELLIX
A Schaeffler Company

Ewellix is a global supplier of linear motion and actuation solutions, part of the SKF heritage and now under the Schaeffler Group, with over 50 years of engineering expertise. The range spans telescopic pillars, standard and heavy-duty linear actuators, and application-specific solutions including the CAWD series developed for on-road vehicles. The key feature of Ewellix's linear motion solutions is that they combine automotive-grade sealing and durability — from -40°C to $+85^{\circ}\text{C}$, IP67/69K — with the precise, repeatable push-pull motion needed for ramps, lifts and aerodynamic wind deflectors.



TELESCOPIC PILLARS

Push-pull actuation

- Push or pull load up to 4 kN
- Speed up to 80 mm/s
- Robotics and automation kits
- Used for height-adjustable systems



LINEAR ACTUATORS

Standard electromechanical

- 12-24-48 VDC, 120-230-400 VAC
- Max load up to 12 kN
- Speed up to 150 mm/s
- General-purpose push-pull motion



CAWD WIND DEFLECTOR ACTUATORS

For on-road vehicles

- IP67/69K, -40°C to $+85^{\circ}\text{C}$
- Up to 3% fuel savings via wind deflector
- Manual or electrical operation
- Self-locking up to 2500 N



HIGH-PERFORMANCE LINEAR GUIDES & ACTUATORS

Heavy-duty positioning

- Shafts and rail guides with ball bearings
- Actuators up to 500 kN
- Speed up to 1,111 mm/s
- Used for heavy-duty ramp and lift systems



CONTROL UNITS

For actuator systems

- Dedicated control electronics for actuators
- Compatible with multiple actuator series
- Used for ramp, lift and deflector control
- Customizable configurations



FOOT & HAND SWITCHES

Manual actuator control

- Manual operating switches for actuators
- Foot-pedal or handheld formats
- Used for driver-operated ramp/lift control
- Robust for repeated daily use

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APPLICATION IN BUS & COACH

Sealed power, data and USB connections throughout the vehicle — passenger USB charging and information-system links, exterior LED lighting circuits — plus dashboard rocker and toggle switching and vandal-resistant controls in passenger areas.



Bulgin is a British manufacturer with over 95 years of experience, recognised as a leading specialist in environmentally sealed connectors and components, with a dedicated Transport & Infrastructure division serving vehicle and infrastructure applications. The range spans the Buccaneer circular family for power, signal and data, rectangular power connectors for cable-to-cable runs, and an extensive switch portfolio inherited from Arcoelectric. The key feature of Bulgin's range is that power, data and USB connections share the same sealed IP69K construction — so exterior wiring and passenger-accessible ports work to one consistent protection standard.



7000 SERIES BUCCANEER

Compact circular power

- Bayonet quick-coupling mechanism
- Plastic or metal housing
- 2-22 contacts, up to 16A, 227V AC/DC
- IP66, IP68 and IP69K when mated



4000 SERIES BUCCANEER

Miniature sealed circular

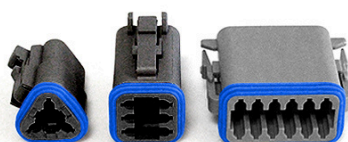
- Ø19.7mm over coupling ring
- Quick-turn bayonet, Valox PC/PBT body
- 3-12 contacts, up to 13A, 600V AC/DC
- IP66, IP67, IP68 and IP69K rated



DATA BUCCANEER (6000 SERIES)

Sealed USB & Ethernet

- Mini-USB, Micro-USB and USB-C versions
- Sealed RJ45 to Cat 5e, up to 100MHz
- Front, rear and PCB panel mount options
- IP66 to IP69K protection



RECTANGULAR POWER CONNECTORS

Cable-to-cable, IP68

- Polybutylene with glass-fibre reinforcement
- Enhanced sealed retention options
- IP68 rated for outdoor transport use
- Used for exterior LED lighting circuits



ROCKER & TOGGLE SWITCHES

Arcoelectric heritage range

- Rocker switches up to 20A, 277Vac
- Nylon and metal heavy-duty toggles
- Waterproof variants sealed to IP67
- UL, CSA and ENEC certified



VANDAL-RESISTANT SWITCHES

Stainless steel, up to 5A

- Rated up to 5A, 250Vac
- Stainless steel construction
- Illuminated and non-illuminated versions
- For passenger-accessible control points

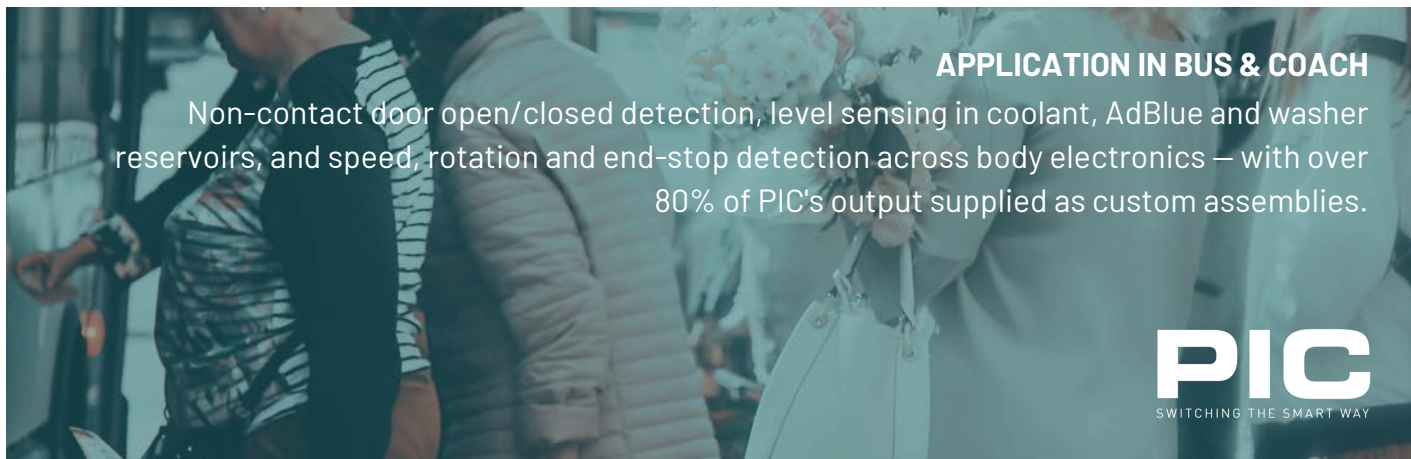
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APPLICATION IN BUS & COACH

Non-contact door open/closed detection, level sensing in coolant, AdBlue and washer reservoirs, and speed, rotation and end-stop detection across body electronics — with over 80% of PIC's output supplied as custom assemblies.

PIC
SWITCHING THE SMART WAY

PIC GmbH is a German manufacturer headquartered near Nuremberg, with production plants in China and Turkey, and one of the leading suppliers of reed and Hall sensor technology for the automotive, industrial, domestic appliance and medical sectors. The range spans reed switches, SMD reed switches, encapsulated reed sensors, level sensors, Hall sensors and actuating magnets.

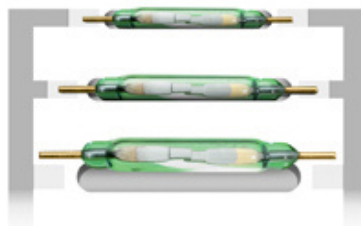
The key feature of PIC's sensors is that switching is entirely contact-free and hermetically sealed — the reed contacts sit inside a sealed glass tube, so vibration, dust and moisture in the vehicle body never reach the switching element.



REED SWITCHES

Contact-free magnetic switching

- Ferrous contacts sealed in a glass tube
- Form A, form B and form C versions
- Miniature, standard and high-power types
- Arc contained inside the sealed capsule



SMD REED SWITCHES

Surface-mount packages

- Surface-mount reed switch packages
- Suited to automated PCB assembly
- Compact footprint for control modules
- Selected and modified versions available



REED SENSORS

Encapsulated in housing

- Reed switch moulded into metal or plastic
- Through-hole, flatpack, tubular, snap-fit
- Better mechanical protection than bare switches
- Matching actuating magnets available



TUBULAR THREADED SENSORS

Position & door detection

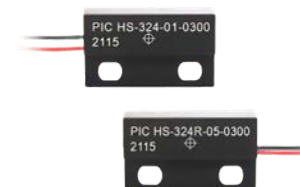
- Cylindrical body with threaded mounting
- Non-contact position and end-stop sensing
- Custom cable and connector assemblies
- Robust against vibration and washdown



LEVEL SENSORS

PLS series & reed chains

- PLS series, form A and form B versions
- Ratings from 250 VAC / 50 W
- Polypropylene, polyamide or stainless steel
- Side, bottom and top mounting



HALL SENSORS

Solid-state magnetic sensing

- Developed with a leading Hall chip maker
- Latching and switching versions
- Flange-mount and 2-wire types
- Every standard version customisable

ERMEC, SL BARCELONA
Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
Espanya
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID
c/Puerto Rico, 4
28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51
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ODU is a German manufacturer specialising in connectors and cable assemblies, with design, development, tool-making, moulding, stamping, turning and assembly all carried out in-house at plants in Germany, Romania, the USA, China and Mexico. The range spans plastic and metal circular connectors, the modular ODU-MAC platform, heavy-duty connectors and a dedicated automotive division for e-mobility.

The key feature of ODU's range is the contact system itself — SPRINGTAC, TURNTAC and STAMPTAC technologies engineered for high mating-cycle counts and low insertion forces, which is what determines the working life of a charging interface.



ODU-MAC BLUE-LINE Modular hybrid interface

- Power, signal, data and media in one interface
- Configurable module inserts
- Manual or automated mating
- Rack-and-panel or cable-to-cable



ODU-MAC SILVER-LINE Automated docking

- Automatic coupling system
- Configurable modular architecture
- Compatible with high-speed data modules
- Service life over 100,000 mating cycles



ODU TURNTAC CONTACTS

Turned slotted contacts

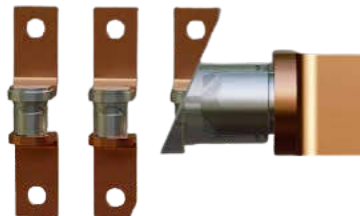
- Up to 20,000 mating cycles
- Low and stable mating forces
- Misalignment tolerance up to 5°
- Used in charging inlets and connectors



ODU STAMPTAC CONTACTS

Stamped & formed contacts

- For IEC 62196 and SAE J1772 interfaces
- IP67 sealing, IP69 with silicone overmould
- Designed for high-volume production
- Tailored to each charging configuration



ODU DOCKING MATE Direct mating system

- Compensates misalignment up to ± 3 mm
- Connects modules without cables
- Suited to busbar and battery-pack links
- Enables automated assembly



CIRCULAR CONNECTORS Plastic & metal, custom cable

- Plastic and metal housings
- Threaded locking secure under heavy vibration
- Protection to IP6K8, -51°C to +125°C
- Cable assemblies built in-house

APPLICATION IN BUS & COACH

Cooling for HVAC and climate units, traction inverters and power electronics, battery packs and driver display and control cabinets — with sealed versions for roof and underfloor positions.



Pelko Motors is a Canadian company founded in the 1980s and a manufacturer of brushless axial AC and DC fans and radial blowers, specialising in high-tech OEM solutions and producing in certified facilities under ISO 9001, ISO 14001 and the IATF 16949 automotive quality standard.

The key feature of Pelko's fans is how far each one can be adapted — sealing level, speed control and temperature control are all configurable, so the same frame size can be specified for a sheltered control cabinet or an exposed roof-mounted unit.



DC AXIAL FANS

25x10 up to 172x150 mm

- Frame sizes from 25x10 to 172x150 mm
- Brushless construction, 12 and 24 VDC
- IP sealing levels to specification
- Main range for onboard electronics cooling



DC RADIAL BLOWERS

Directed airflow

- Centrifugal type with outlet nozzle
- Channels the air where it is needed
- Sizes up to 193x73 mm
- For ducted and confined installations

ERMEC, SL BARCELONA
Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
Espanya
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID
c/Puerto Rico, 4
28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51

www.ermec.com





Kaku is a major manufacturer of ventilation solutions, with a range running from complete fan assemblies and filters through to AC, DC and EC fans — the EC line being its low-consumption, environmentally responsible family. Its fans are distributed in Europe through SEPA Europe.

The key feature of Kaku's fans is the build: aluminium housings with magnesium die-cast impellers and precision-balanced rotors, permanently protected against rotor blocking and thermal overload, which is what lets the AC range ship at IP55 as standard.



AC AXIAL FANS

IP55 as standard

- Standard IP55 protection as supplied
- Magnesium alloy for heat dissipation
- Built for damp and dusty environments
- UL and CE approved



DC AXIAL FANS

172x152 to 280x280 mm

- Frame sizes 172x152 to 280x280 mm
- IP sealing level to specification
- Speed and temperature control options
- For high-airflow duty



EC FANS

AC supply, DC efficiency

- Combines AC supply with DC motor efficiency
- No separate controller or converter needed
- Precise speed control across the range
- Lowest running consumption of the three



BALL-BEARING VERSIONS

Extended temperature & life

- Ball bearings rated -40°C to +85°C
- L10 life 40,000 h, MTTF 120,000 h at 40°C
- Sleeve-bearing option for milder duty
- Precision balanced, shock resistant



ASSEMBLIES & FILTERS

Grilles, filters & mounting

- Metal and plastic guard grilles
- Metal filter elements
- Mounting and connection accessories
- Complete fan-and-filter assemblies

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Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
Espanya
bcn@ermec.com
Tel.: (+34)93.450.16.00

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28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

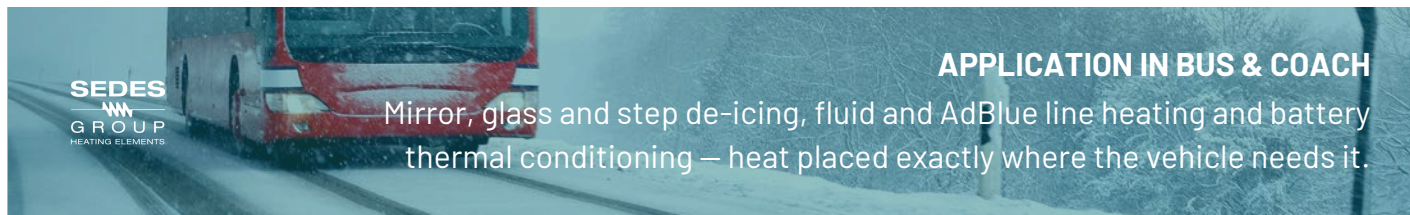
ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51

www.ermec.com



SEDES GROUP HEATING ELEMENTS



SEDES Group is an Italian manufacturer of heating elements, thermal systems, wiring assemblies and custom heating solutions, with certified components used in home appliances, HVAC systems and professional machinery. Its range runs from ultra-flat and finned formats to self-regulating cartridges, flexible heating cable and heating aluminium foil. The key feature of SEDES's range is that the element is engineered to the shape of the part being heated, rather than the part being designed around a standard element.



ULTRA-FLAT HEATERS

Ultra-thin and flexible

- Very low profile, flexible construction
- Even heat spread across the surface
- Fits where a tubular element cannot
- Custom shapes and power ratings



SELF-REGULATING CARTRIDGE

Self-limiting output

- Output falls as temperature rises
- No external thermostat required
- Reduces the risk of overheating
- Suited to fluid and tank heating

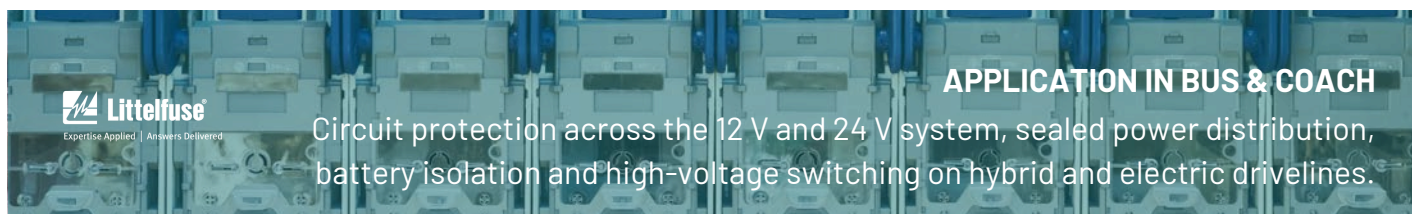


FLEXIBLE HEATING CABLE

Routed to the part

- Follows pipes, tanks and irregular shapes
- Cut and routed to the installation
- Keeps fluid lines above freezing
- Custom lengths and terminations

LITTELFUSE CIRCUIT PROTECTION



Littelfuse is the world's largest fuse manufacturer and runs a dedicated Commercial Vehicle Products division that covers buses directly, with fuses, power distribution modules, battery disconnect switches, circuit breakers and relays built for the vibration, temperature and duty cycles of a commercial vehicle.



COMMERCIAL VEHICLE FUSES

Blade to bolt-down

- MINI, ATO and MAXI blade fuses
- JCASE and PAL cartridge fuses
- MIDI and MEGA bolt-down fuses
- Matching automotive fuse holders



PDMs & BATTERY SWITCHES

Sealed power distribution

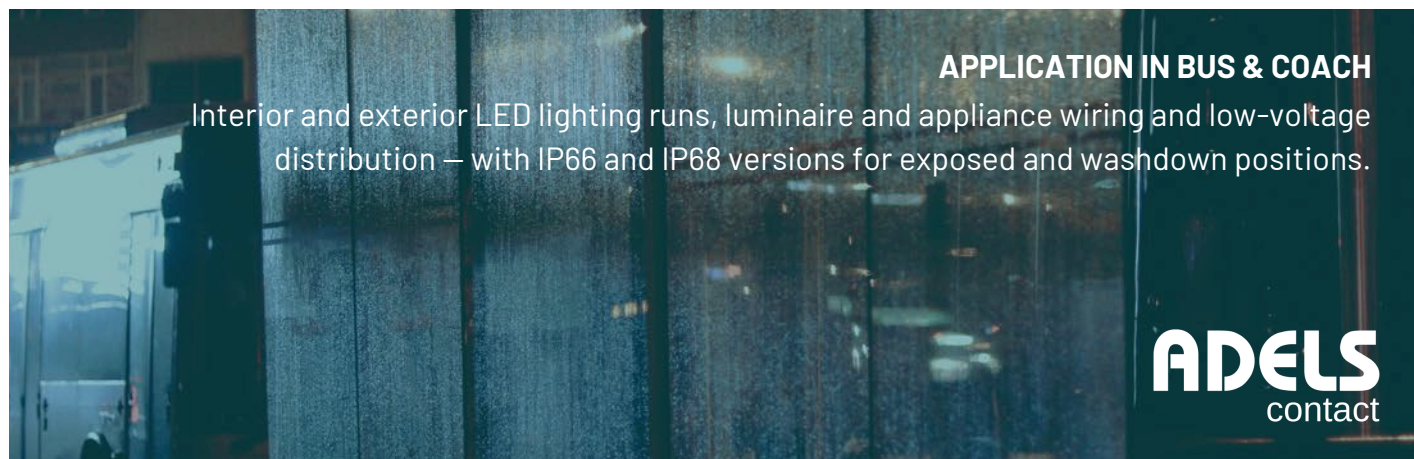
- Sealed power distribution modules
- HV distribution units for hybrid drivelines
- Battery master disconnect switches
- Weld-breaker and lockout safety features



BREAKERS & RELAYS

In-cab power control

- Automotive circuit breakers
- Plug-in relays and solenoids
- High-voltage DC contactors
- In-cab and specialty switches



Adels-Contact is a German family-run manufacturer founded in 1930 and based in Bergisch Gladbach, specialising in electrical terminal blocks and connectors for building technology and for manufacturers of lighting and electrical appliances. The range is built around numbered connector systems — AC 162, AC 164, AC 166 G and AC 167 micro — plus screwless luminaire connectors, SMD connectors and sealed lighting connection sets.

The key feature of Adels-Contact's systems is coded, screwless plug-and-socket connection: a luminaire or a whole lighting run is wired by pushing connectors together, which removes screw terminals and the assembly errors that come with them.



AC 166 G SYSTEM
Cord sets, plug & socket

- Installation connector system
- Supplied as ready-made cord sets
- Coding options prevent mismating
- Fast, fail-safe wiring runs



AC 164 SYSTEM
Flat, for tight spaces

- Plug and socket connectors, flat version
- Compact where space is limited
- Coding options available
- Quick plug-in connection



AC 162 SYSTEM
LED & low-voltage

- Designed for LED and low-voltage circuits
- Compact system format
- For luminaire and appliance wiring
- Same plug-and-socket principle



FUSED TERMINAL BLOCKS
standard 5 x 20 mm or 6.3 x 32 mm sizes

- screw terminal blocks and hybrid screw-screwless
- "Glow-Wire" Compliant Design
- Compact footprint



LCS 75 LIGHTING SET
IP66 luminaire connection

- Fast connection for IP66 luminaires
- Sealed against water ingress
- For exterior and exposed fittings
- Ready-to-fit connection sets



SMD CONNECTORS
Board-mounted for LED

- Surface-mount format
- Soldered directly to the LED board
- Removes a wiring step in assembly
- Part of the lighting connection range

ERMEC, SL BARCELONA
Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
Espanya
bcn@ermec.com
Tel.: (+34)93.450.16.00

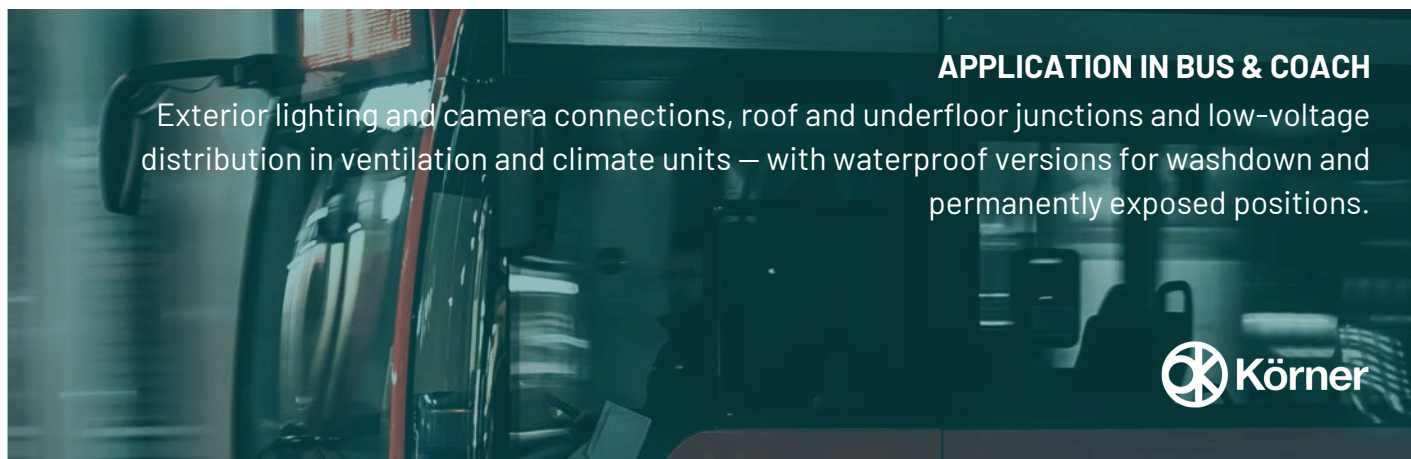
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c/Puerto Rico, 4
28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

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Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
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ERMEC BILBAO
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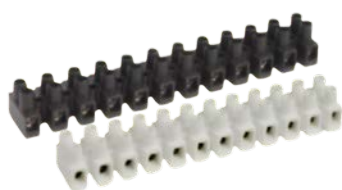
APPLICATION IN BUS & COACH

Exterior lighting and camera connections, roof and underfloor junctions and low-voltage distribution in ventilation and climate units – with waterproof versions for washdown and permanently exposed positions.



Körner is an Italian manufacturer founded in 1951 in Cusago, near Milan, producing terminal blocks, quick connection devices, boxes and connectors for low-voltage applications, with screw-screw, screw-tab and tab-tab connections. Its markets are lighting, home appliances, ventilation, air conditioning and refrigeration, and every product is certified by the main standards institutes.

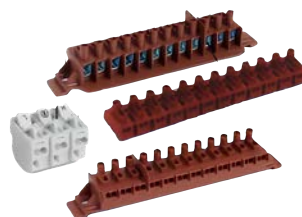
The key feature of Körner's range is the sealed side of it: waterproof connectors and double-insulated enclosures tested to withstand immersion to four metres, which is what qualifies them for exposed exterior positions on a vehicle.



SCREW TERMINAL BLOCKS

Three body materials

- Fiberglass bodies for high temperature
- Polyamide and polypropylene versions
- Screw-screw, screw-tab and tab-tab
- Certified to low-voltage standards



QUICK TERMINAL BLOCKS

Screwless connection

- Connected without special tools
- Cuts wiring and commissioning time
- Speeds up component replacement
- Same certified low-voltage ratings



IP68 CONNECTORS

Tested to 4 m immersion

- Waterproof to four metres depth
- IP67, IP68 and IP69K configurations
- Withstands high-pressure washing
- Resists corrosive atmospheres



SCREW DERIVATIONS

Sealed in-line taps

- Tap a branch off an existing run
- Sealed to the same IP68 rating
- No need to break the main cable
- Part of the waterproof range



JUNCTION BOXES

Double-insulated

- Double-insulated sealed enclosures
- House terminal blocks and joints
- For roof and underfloor positions
- Several sizes and cable entries



CABLE LUGS & TERMINALS

Pre-insulated, reinforced

- Reinforced pre-insulated bullet terminals
- Male and female cylindrical types
- For harness and loom termination
- Sized across the conductor range

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Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
España
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID

c/Puerto Rico, 4
28222 Majadahonda
España
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL

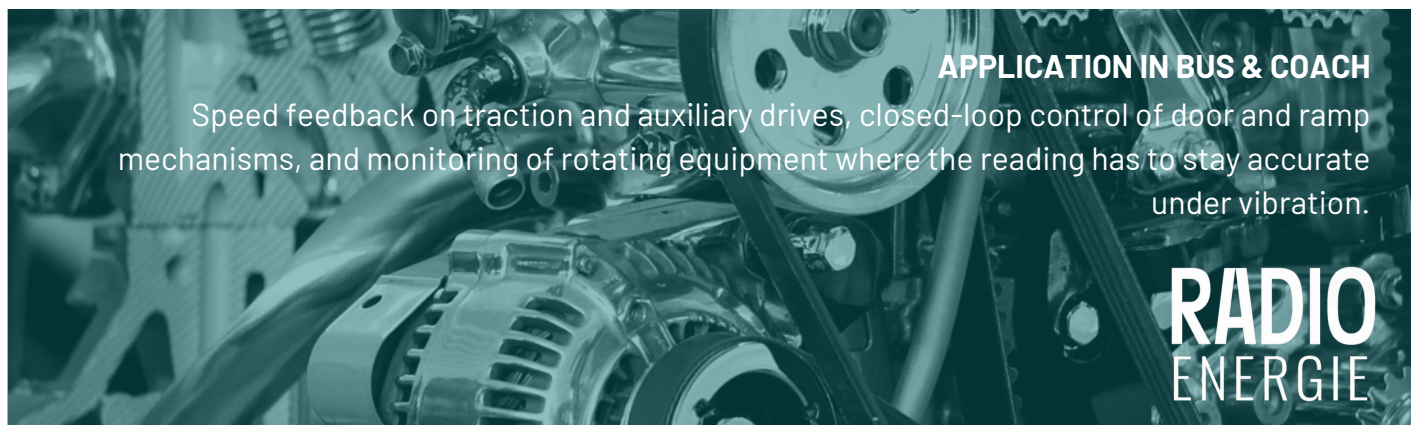
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO

bilbao@ermec.com
Tel.: (+34)91.828.56.51

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APPLICATION IN BUS & COACH

Speed feedback on traction and auxiliary drives, closed-loop control of door and ramp mechanisms, and monitoring of rotating equipment where the reading has to stay accurate under vibration.

RADIO ENERGIE

Radio-Energie is a French manufacturer of rotational speed feedback devices — DC tachogenerators, incremental optical encoders and permanent-magnet generators — used for closed-loop variable-speed control, monitoring and indication. Its RE.0444 tacho is an industry reference, listed by drive manufacturers such as Parker SSD and ABB under their own part numbers.

The key feature of Radio-Energie's range is mechanical interchangeability: the RCI444R encoder shares the flange and shaft of the RE.0444R tacho, so a drive can move from analogue to digital speed feedback without changing the mounting.



RE.0444 TACHOGENERATORS

60 V or 100 V per 1000 rpm

- DC output 60 V or 100 V per 1000 rpm
- Up to 12,000 rpm depending on version
- IP54 body with terminal box
- B5 flange, 11 mm shaft with 4 mm key



RE.0588 TACHOGENERATORS

Larger frame

- 198 mm flange, 14 mm shaft
- Maximum speed 8,000 rpm
- IP54 with silver-graphite brushes
- For higher-inertia drive shafts



TWIN-SHAFT VERSIONS

Tacho plus encoder

- Rear flange and second 7 mm shaft
- Encoder mounted piggy-back on the tacho
- Analogue and digital feedback in one unit
- Adaptations for several encoder types



RCI444R ENCODERS

Incremental optical, HTL

- 1000 or 1024 ppr, programmable
- HTL push-pull A, B and Z channels
- 4.75 to 30 V DC supply, IP65
- Dedicated to robust environments



BRUSH SETS

Serviceable wear parts

- Electrographite (EG) brush sets
- Silver-graphite (CA) for longer life
- Supplied in sets of four
- Keeps units serviceable in the field



MOUNTING & CONNECTION

B5 flange, box or M23

- Industry-standard B5 flange mounting
- Terminal box or M23 12-pin connector
- Interchangeable tacho and encoder fixing
- Direct replacement for common drive references

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08210 Barberà del Vallès
España
bcn@ermec.com
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c/Puerto Rico, 4
28222 Majadahonda
España
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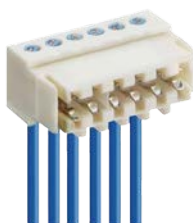
APPLICATION IN BUS & COACH

Dashboard and cabin wiring, LED lighting, onboard data networks for passenger information and cameras, and power electronics on electric and hybrid buses.

Lumberg
passion for connection

Lumberg Connect is a German connector manufacturer based in Schalksmühle, with plants in Cloppenburg, Świebodzin and Dongguan. The range covers RAST connection systems from 1.5 to 7.5 mm pitch, high-current contact elements, Datacom connectors and SKEDD direct-plug technology.

The key feature of Lumberg's range is that the same connection system spans the whole vehicle: dashboard and cabin wiring, LED lighting, onboard data networks and the power electronics of an electric driveline. Automotive production runs at the Schalksmühle and Cloppenburg plants, both certified to IATF 16949.



RAST 2.5 (SERIES 35) Power and signal to board

- Pitch 2.5 and 5.0 mm
- 2 to 10 poles
- 6 A at 70 °C, 400 V AC
- -40 °C to +130 °C



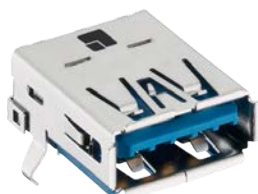
RAST 7.5 POWER (SERIES 37) Power for electric drivelines

- Pitch 7.5 mm
- 1 to 4 poles
- 25 A at 85 °C, 500 V AC
- -40 °C to +130 °C



HIGH-CURRENT CONTACTS 4580 Direct high-current contact

- Up to 60 A
- Contact resistance < 0.5 mΩ
- Tab 5.3-7.2 x 1.5-2.0 mm
- -40 °C to +120 °C



DATAKOM RJ45 (SERIES 25) Onboard data network

- Cat. 6a, 8p8c
- 10 Gbit/s at 500 MHz
- Tool-free IDT termination
- IPx7 sealed version



SMARTSKEDD (SERIES 73) Direct plug, no tool

- Pitch 2.5 mm
- 4 A at 85 °C, 50 V AC
- Reversible SKEDD contact
- -40 °C to +130 °C



RJ45 - SERIES 25 Modular IPx7

- Tool-free IDT Termination
- 10Gbit/s
- 500 mating cycles
- -40 °C to +85 °C

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08210 Barberà del Vallès
Espanya
bcn@ermec.com
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c/Puerto Rico, 4
28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

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4450-068 Matosinhos
Portugal
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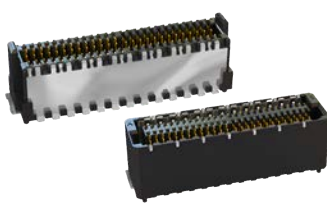
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EPT is a German manufacturer based in Peiting, producing board-to-board, backplane and power connectors, with press-fit contact technology as its core competence. The range runs from 0.5 mm SMT interconnects for compact control electronics to rugged DIN 41612 backplane connectors for rack-mounted equipment.

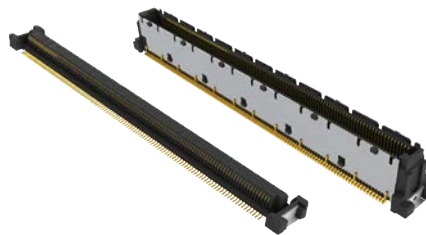
The key feature of ept's range is that the connection is made without solder: a press-fit contact is pressed into the plated hole and holds under vibration and thermal cycling, which is what the electronics inside a vehicle are exposed to. Buses are named among the vehicles it equips, and its plants in Peiting, Buching, Augsburg, Habartov and South Chesterfield are certified to IATF 16949.



ZERO8

High-speed board to board

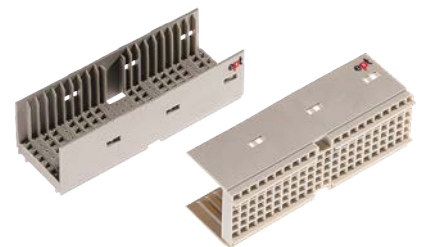
- Pitch 0.8 mm, 12 to 80 contacts
- Data rate up to 16 Gbit/s
- ± 0.4 mm working tolerance
- 500 mating cycles minimum



COLIBRI

Ultra-compact SMT interconnect

- Pitch 0.5 mm, 40 to 440 poles
- 0.5 A per contact, 50 V AC
- Up to 16 Gbit/s, PCIe Gen 4
- UL recognised, ECBT2.E130314



HM 2.0 HARD METRIC

High-density backplane

- Pitch 2.0 mm, up to 200 contacts
- 1.5 A at 20 °C, 750 V
- -55 °C to +125 °C
- Over 250 mating cycles



DIN 41612 / IEC 60603-2

Rugged rack backplane

- Pitch 2.54 to 7.62 mm
- Up to 15 A per contact
- -55 °C to +125 °C
- 400 mating cycles



FLOAT27

Floating anti-vibration contact

- Pitch 1.27 mm, 80 poles
- ± 0.8 mm X/Y compensation
- 20 g vibration, 50 g shock
- 500 mating cycles, grade 1



PRESS-FIT CONTACTS

Solderless board contact

- Shock resistance to 200 G
- Hole diameter 0.56 to 2.0 mm
- Band thickness 0.2 to 1.2 mm
- No soldering, no reflow step

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España
bcn@ermec.com
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c/Puerto Rico, 4
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España
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Portugal
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APPLICATION IN BUS & COACH

Rear cabin heating and climate circuits, battery and power-electronics cooling, and engine coolant loops on electric and hybrid buses.

Robertshaw is an American manufacturer of electromechanical controls and valves, with more than 125 years of flow-control engineering behind it. Its transportation range covers motorized coolant valves for the cabin, battery and engine circuits, and check valves for those same loops.

The key feature of Robertshaw's range is where it sits in the vehicle: the water side of climate control and thermal management, alongside the air side already covered in this guide. The motorized valves are built in 12 V and 24 V versions and are driven over LIN, PWM or an analogue signal — the 24 V supply and the LIN bus are what place them in a commercial vehicle rather than a car.



H38 MOTORIZED VALVE
Rear cabin HVAC circuit

- 2-way and 3-way versions
- Ethylene glycol, -40 to 85 °C
- 0 to 275 kPaG
- 100,000 cycles



H42 MOTORIZED VALVE
Battery and cabin cooling

- 2, 3 and 4-way versions
- 12 V and 24 V versions
- LIN, PWM and analogue drive
- Nylon 66, -40 to 85 °C



H45 MOTORIZED VALVE
Engine and battery cooling

- 2 to 5-way versions
- Ports 5/8", 3/4" and 1"
- 12 V and 24 V versions
- 0 to 275 kPaG



H43-1000 RESTRICTOR
Flow limiting in the loop

- Same body as the H43-5000
- Ports 5/8" and 3/4"
- Limits flow, does not stop it
- Glass-reinforced nylon 6/6



LPC CHECK VALVES
Built to the application

- Brass or plastic body
- Up to 0.75" diameter
- Up to 1.5" length
- 100 % performance verified

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TYPE APPROVAL & STANDARDS IN BUS & COACH



Type approval in bus and coach is granted to the finished vehicle, not to the components inside it. What a component supplier holds in its own right is a certified quality system and independently tested product approvals. Those set out below are held by the manufacturers represented by Ermec (Omega Group).

IATF 16949 – AUTOMOTIVE QUALITY MANAGEMENT

Built on top of ISO 9001, with additional requirements written by the vehicle manufacturers themselves: defect prevention, full traceability of every batch, formal part approval before series production, and control plans for each process. It is the certification a bus or coach OEM looks for first, because it is what lets a component enter a series build without a separate supplier audit.

Held by APEM at its automotive sites in France and Tunisia, and by Sensata, Johnson Electric, PIC, ODU, Pelko and Littelfuse. Eaton Bussmann builds its vehicle fuse ranges under it, Ewellix holds it at its Bulgarian plant, Lumberg at Schalksmühle and Cloppenburg, and ept at its five plants.

ISO 9001 – QUALITY MANAGEMENT

The general standard governing how design, production and continual improvement are controlled. It is the foundation IATF 16949 is built on, and the baseline for those ranges here that are not automotive-specific.

Held by APEM at every site, MEC, IDEC across the whole group, Eaton, Ewellix, SEDES Group, Adels-Contact, Radio-Energie, Cynergy3, Lumberg and ept.

PRODUCT APPROVALS – UL, CSA, VDE, ENEC, IMQ, TÜV

These certify the part itself rather than the plant. An independent laboratory tests the component against a safety standard and then audits the line that produces it. For a vehicle builder they remove the need to re-qualify a bought-in part.

Held by Bulgin (UL, CSA, VDE, ENEC), IDEC (UL, CSA, TÜV, CCC and CE), Körner (IMQ, VDE, UL, cURus), Adels-Contact (over 130 international approvals), SEDES Group (VDE, UL, CE), Kaku (UL, CE), Cynergy3 (UL, NSF, WRAS) and ept (UL for DIN 41612, hm 2.0 and Colibri).

ISO 14001 AND ISO 45001 – ENVIRONMENT AND OCCUPATIONAL SAFETY

Increasingly requested in public-transport tenders, where the operator assesses the supply chain as well as the vehicle itself. ISO 14001 is held by Ewellix, Adels-Contact, Radio-Energie, Lumberg and ept. ISO 45001 is held by Ewellix.

ATEX AND VEHICLE DESIGN STANDARDS

Radio-Energie is ATEX certified at its Châtelleraut plant. Eaton Bussmann designs its vehicle fuse ranges to ISO 8820-8 and JASO D622, the two standards that govern automotive fuse dimensions and behaviour.

ERMEC, SL BARCELONA
Avda. Arraona, 85, Nave 4
08210 Barberà del Vallès
Espanya
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID
c/Puerto Rico, 4
28222 Majadahonda
Espanya
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

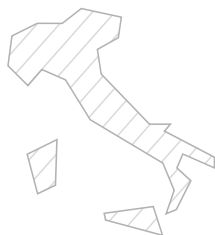
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bilbao@ermec.com
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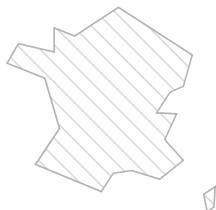
ITALY



1300 sqm of commercial office
5200 sqm warehouse
7100 Pallet spaces
15000 Locations



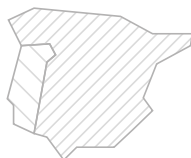
FRANCE



300 sqm of commercial office
600 sqm warehouse
1200 Pallet spaces
7000 Locations



SPAIN AND PORTUGAL



400 sqm of commercial office
700 sqm warehouse
450 Pallet spaces
7000 Locations



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bcn@ermec.com
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28222 Majadahonda
España
madrid@ermec.com
Tel.: (+34)91.828.56.51

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4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51

www.ermec.com



AUTOMATED INNOVATION



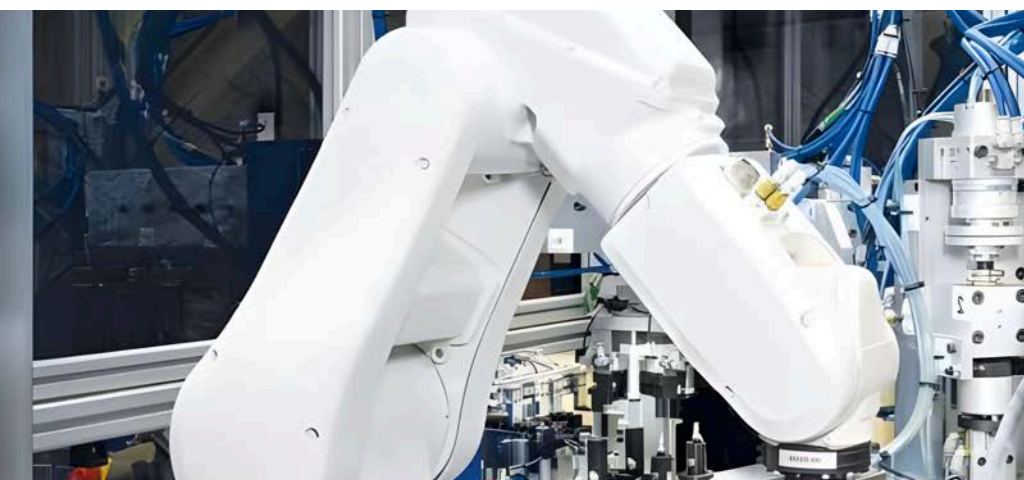
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Avda.Arraona,85, Nave 4
08210 Barberà del Vallès
España
bcn@ermec.com
Tel.: (+34)93.450.16.00

ERMEC MADRID
c/Puerto Rico, 4
28222 Majadahonda
España
madrid@ermec.com
Tel.: (+34)91.828.56.51

ERMEC PORTUGAL
Rua Brito Capelo, 807
4450-068 Matosinhos
Portugal
portugal@ermec.com
Tel.: (+35)1707509539

ERMEC BILBAO
bilbao@ermec.com
Tel.: (+34)91.828.56.51

www.ermec.com



OUR QUALITY IS CERTIFIED AND ACCREDITED



CALIDAD

UNI EN ISO 9001:2015

We have been ISO9001 certified for over 3 years, we guarantee the best quality and service standards.



AMBIENTE

UNI EN ISO 14001:2015

Omega's activities have always been designed to respect the environment. Acting sustainably is a fundamental element of our business.



ÉTICA

SA 8000:2014

Working and behaving seriously and ethically has allowed us to receive the SA8000 certification which attests internationally our respect for human and worker's rights.

ERMEC,SL BARCELONA

Avda.Arraona,85, Nave 4
08210 Barberà del Vallès
España
bcn@ermec.com
Tel.: (+34)93.450.16.00

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c/Puerto Rico, 4
28222 Majadahonda
España
madrid@ermec.com
Tel.: (+34)91.828.56.51

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4450-068 Matosinhos
Portugal
portugal@ermec.com
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Tel.: (+34)91.828.56.51

www.ermec.com





ermec.es

ERMEC,SL BARCELONA

Avda.Arraona,85, Nave 4
08210 Barberà del Vallès
España
bcn@ermec.com
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www.ermec.com



Ermec S.L.

Avda. de Arraona 85 - Nave 4
08210 Barberà del Vallès
Barcelona (SPAIN)
Tel. +34 93 450 1600
info@ermec.com
www.ermec.es



Omega Fusibili S.p.A.

Via Edison, 10 - 20057
Assago (MI) - Italia
Tel. +39.02.488481
Fax +39.02.4882522
omega@omegafusibili.it
www.omegafusibili.it



Omega Composants Sarl

220 rue Ferdinand Perrier
69800 Saint-Priest - France
Tel. +33 (0)4 78 90 85 64
Fax. +33 (0)4 78 90 84 65
omega@omegacomposants.fr
www.omegacomposants.fr

